

CHAPTER 9 – CONTEXT SENSITIVE SOLUTIONS

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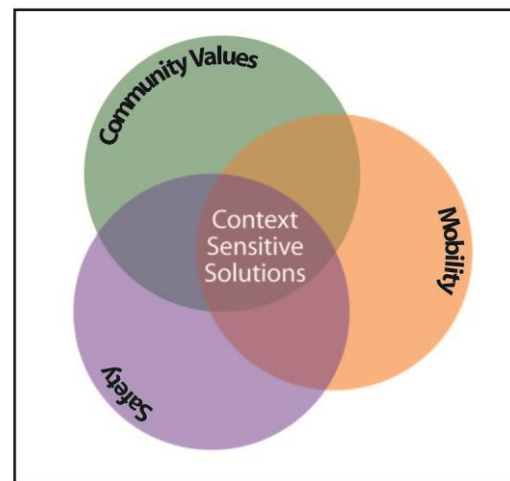
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Introduction

Context Sensitive Solutions (CSS) happens when existing processes are designed to help make transportation decisions that are sensitive to impacts and improvements on both the environment and communities. CSS is not a new process or a process separate from other transportation processes. To the greatest extent feasible, all projects should be planned, designed, constructed, and maintained to be sensitive to the context. No project is exempt. Sometimes referred to as “Thinking Beyond the Pavement,” CSS reflects an understanding that a host of important and often competing values or interests must be considered in defining and addressing transportation needs. Being sensitive to the context does not always add cost or time to complete a transportation project. Figure 1, **Elements Affecting Context Sensitive Solutions**, illustrates this concept. The key elements are safety, mobility and community values.

Community values may concern the preservation and enhancement of scenic, aesthetic, cultural, historic, environmental and other community resources. Being sensitive to the context involves collaboration of technical professionals, local government officials, community interest groups, landowners, facility owners, the general public and other stakeholders who will live and work near and use the transportation facility. Collaboration of this kind helps the Project Manager (PM) gain an understanding of community values, and incorporate or address them in the development of a project. Fundamental to CSS is the development of a number of alternatives, and selection of the best “context sensitive” solution to meet project and community needs. Any decision can be sensitive to the context, including decisions about project start date, end date, night work, signs, signals, drainage, lighting, utilities, design speed, posted speed, mowing, and more.

Figure 1
**Elements Affecting
Context Sensitive Solutions**



In Florida, CSS concepts began with the Transportation Design for Livable Communities (TDLC) policy, adopted by the Florida Department of Transportation (FDOT) in 1998 and subsequently incorporated into Chapter 21 of the [Plans Preparation Manual \(PPM\), Volume 1](#). Figure 2, **Florida Policy on Transportation Design for Livable Communities**, sums up the intent of this initiative:

Figure 2
Florida Policy on Transportation Design for Livable Communities

It is the policy of the Department to consider Transportation Design for Livable Communities (TDLC) features on the State Highway System when such features are desired, appropriate and feasible. This involves providing a balance between mobility and livability. TDLC features should be based on consideration of the following principles:

1. Safety of pedestrians, bicyclists, motorists and public transit users.
2. Balancing community values and mobility needs.
3. Efficient use of energy resources.
4. Protection of the natural and man-made environment.
5. Coordinated land use and transportation planning.
6. Local and state economic development goals.
7. Complementing and enhancing existing Department standards, systems and processes.

The FDOT adopted **Policy 000-650-002, [Context Sensitive Solutions](#)** in 2008.

CONTEXT SENSITIVE SOLUTIONS

It is FDOT policy to use a Context Sensitive Solutions (CSS) approach on transportation projects and activities for all modes appropriate to scale, cost, location, and schedule.

CSS is a proactive, collaborative, interdisciplinary approach to transportation decision making, project development, and implementation, taking into account, the views of stakeholders, and the local area where a project will exist, be operated, and be maintained. CSS considers the physical setting in which a project or activity is to be implemented, and seeks to enhance and conserve community defining features and environmental resources. This approach seeks to balance safety and mobility with local priorities. FDOT will encourage communities to contribute financially or in-kind toward enhanced project features and maintenance.

Consistent with the CSS principles prescribed by the Federal Highway Administration, FDOT transportation projects and activities shall be compatible and consistent with available resources, FDOT policies, and community visions.

Section 1.11 of Chapter 1, **PPM, Volume 1**, states that CSS should be considered in all projects, not just those designated as TDLC projects. “It is recognized that the Department is expected to provide mobility and a quality of life that includes the protection of the natural resources and the cultural and social values of the community.”

Useful resources:

- National Cooperative Highway Research Program: [**NCHRP Report 480 - A Guide to Best Practices for Achieving Context-Sensitive Solutions**](#)
- Federal Highway Administration (FHWA): [**Context Sensitive Solutions**](#)
- The American Association of State Highway and Transportation Officials (AASHTO): [**A Guide for Achieving Flexibility in Highway Design**](#)
- National Cooperative Highway Research Program: [**Quantifying the Benefits of Context Sensitive Solutions, NCHRP Report 642**](#)

There is no specific funding allocated for context sensitive features incorporated in highway projects. In fact, frequently there are no added project costs. These features can be funded with normal project funding as long as the project program scope and estimates accurately reflect the community values. When additional funding is desired, a joint venture with a local agency can be used. A joint venture may be necessary when FDOT and the local governments mutually agree that treatments such as historic appearing lighting are desired. FDOT will usually pay for the basics (assuming that lighting is warranted) and the local government will pay for the difference. In addition, the local government must sign a Maintenance Agreement accepting responsibility to maintain additional features requested.

CSS Considerations in Project Phases

Planning: The initial definition of a transportation need takes place in the planning phase. This is the ideal time to get the public involved in the decision-making process. It is important that all parties agree that a transportation need exists, define that need and decide whether or not a project to address it should be pursued. Stakeholders need to address the basic need for a project in the planning phase. Some questions to ask during the planning phase include:

- How will the proposed transportation improvement affect the general physical character of the area surrounding the project?
- Are there unique historic or scenic features in the affected area?
- What are the safety, capacity and cost concerns of the community?

Project Development and Environment (PD&E) Studies: The draft scope of services for the PD&E phase should be widely circulated for comment among the various professional disciplines within the district, including the district planning staff serving as community or metropolitan planning organization liaisons, and the District Design Office. These personnel, who often have the closest and most frequent contact with local agencies and the public, should be most aware of local concerns. During the PD&E phase, social, environmental, economic and community impacts are studied in depth. At this stage, the location and conceptual design of the project are set and basic right of way needs identified. These activities must be sensitive to the values of the community and the context and physical location of the project. These considerations should help shape how the project will look and identify constraints and opportunities early in the process. Some questions to ask during the PD&E phase include:

- What are the physical characteristics of the corridor?
- How is the corridor being used (other than for vehicular traffic)?
- Is there significant bicycle or pedestrian travel in the corridor, or is there a significant potential for such use?
- What plants and plant communities exist along the corridor; do they have unique features?
- Are there important viewsheds from the existing roadway or potential viewsheds from a new road?
- How will views of the new or modified road affect the surrounding community?
- What is the size of the existing road and how does it fit into its surroundings?
- Are there historic or especially sensitive environmental features along the road?

- How does the road compare to other roads in the area?
- Are there particular features of the area that the community wants to preserve, such as rural character, neighborhood atmosphere or a main street?
- Are there features that the community wants to change, such as busy overhead utilities?
- What community or social groups are in the area? What are their specific interests? Are different groups affected differently by possible solutions?
- Are there concentrations of children, the elderly or disabled individuals who may have special design and access needs?
- Does the community have an existing master plan, “vision” or similar document?
- Have any local municipalities or resident/property owner groups requested a perimeter wall for their community along the corridor?

The creative process of design usually begins during the PD&E phase and is completed in the design phase. A design that is sensitive to the context involves a collaborative, interdisciplinary approach in which citizens are part of a design team. Various discipline representatives such as traffic engineers, ecologists, planners, landscape architects, urban foresters, arborists, architects, urban designers, biologists, historians, archaeologists, geologists and artists, as well as community leaders, can contribute to the highway design process. Early involvement of these professionals during the PD&E phase can help establish a contextual theme for the road, providing important direction to the design team.

To the greatest extent possible, the PD&E process needs to be flexible within the existing design standards. When the PD&E PM intends to make commitments concerning specific design features that will require a design exception or variation, the District Design Engineer (DDE) should be involved. Though not always possible, approval of any necessary design exceptions or variations should be obtained in the PD&E phase. Context sensitive decisions and commitments must be clearly communicated to the design PM in the project hand-off.

Design: Designing a project sensitive to the context requires a good understanding of the operational effects of highway geometry and sensitivity to local constraints, valued community resources, and desires for unique features or design elements. The design PM must understand the vision expressed by the community during the PD&E phase and any commitments made about project concepts and specific design features. The PM is responsible for understanding this vision and implementing a project that fulfills the vision within the constraints of policy, design criteria and available funds.

Most context sensitive projects can be implemented within the standards and criteria established for the project. Chapter 23 of the **PPM, Volume 1** addresses an FDOT approved process for design exception and variance when standards and criteria cannot address community needs and desires. Normally the criteria in Chapter 2 of the **PPM, Volume 1** apply for new and major reconstruction projects, and the criteria in Chapter 25 of the **PPM, Volume 1** apply to resurfacing, restoration and rehabilitation projects. When TDLC features are proposed, Chapter 21 of the **PPM, Volume 1** requires a concept report documenting the desired project features and the respective responsibilities of all stakeholders. When the DDE approves the Concept Report, the criteria found in Chapter 21 of the PPM, Volume 1 become the applicable criteria for the project.

Understanding Community Needs and Desires

To define issues and arrive at solutions, involve a wide range of both technical specialists and non-technical stakeholders. Specialists and stakeholders contribute information and require information to establish understanding, and to arrive at a consensus solution. Involvement of the general public and transportation partners is an important aspect of all FDOT activities, as expressed in **Policy No. 000-525-050, [Public Involvement](#)**. The FDOT's [Public Involvement Handbook](#) is an excellent resource for PMs.

Planning and especially PD&E projects usually have very sophisticated public involvement processes. For projects to be fully sensitive to their context, it is important to maintain a high level of public involvement effort in both the design and construction phases. The challenge to both the FDOT and the consultant Project Manager is to devise ways to interest the public and get them involved in the decision-making process. The public must see that their active involvement and participation has meaningful impacts on decisions affecting their communities.

Design and construction projects should have a Community Awareness Plan (CAP). Development and execution of this plan can be part of the design consultant scope of services, provided through a task order consultant contract or by the FDOT PM. The CAP explains the activities that will take place to keep the community informed and involved. The scope and complexity of a CAP will vary according to the community concern that is expected about a project. Additional information on public involvement programs is found in Part 2, Chapters 1, 2 and 3 of this Handbook. Chapter 2 of AASHTO publication ***A Guide for Achieving Flexibility in Highway Design*** also contains useful information about conducting public involvement activities.

The PM must understand the needs of the local community. Learning these needs can be a very difficult task since it is common to find several local agencies, organizations, groups and individuals that represent the community. These groups may speak for different elements of the community and may have conflicting goals and interests. The challenge for the PM is to identify all the

stakeholders, establish effective communication with them and be open to their suggestions and inquiries in an effort to build a consensus. When stakeholders disagree, it is sometimes due to a misunderstanding or lack of information. The PM can resolve many conflicts by being open to all stakeholders, actively working to correct misunderstandings and being a clearinghouse for information. Including persons representing a wide array of disciplines in this process will add to the PM's ability to respond effectively to stakeholders' needs.

CSS Concepts

Context Sensitive Design: The best approach to roadway design involves the development of a design theme that is in harmony with the surroundings and ensures that the elements of the roadway are in harmony with each other. Flexibility may be necessary when selecting horizontal and vertical alignment, cross section elements, pavement, shoulder and cross walk materials and texture, pedestrian and bicycle facilities, access features, intersection and interchange design, architectural treatments of bridges, walls, lighting and other roadside furniture, and landscaping. The best designs ensure that these elements are not developed independently, but are complementary to the roadway and its context.

Designers must appreciate that the design scale of a moving vehicle is much different from the scale of a pedestrian or bicyclist, who may also be important users of the facility. Roadways in the context of an urban environment, with pedestrians and property access, require a much different scale than roadways in rural areas with expansive viewsheds. The design element that most affects scale is the cross section. Travel lanes, parking lanes, shoulders, drainage facilities, medians, clear zones, sidewalks and bicycle lanes are all cross section elements that can be designed to accommodate vehicles and the needs of other users. Designers can alter the perceived and actual width and location of these elements through the use of green space, landscaping, lighting, and textured surfaces to provide a context sensitive scale.

The view from the road is the users' perspective, which can leave a lasting impression of the community on visitors as well as residents. The view of the road is the residents' perspective, which can contribute to a feeling of community value and pride. Visual impacts are ascertained by defining the visual environment, identifying key views, analyzing the resources and community responses, and depicting the project appearance. These impacts are then assessed, and avoidance, minimization, and mitigation measures are developed. Additional information on visual impacts can be found in Part 2, Chapter 15, of the [**Project Development and Environment \(PD&E\) Manual**](#) and Section 1.7.2 in Chapter 1, of the **PPM, Volume 1**.

An example is Perimeter Walls: The purpose of a perimeter wall is to provide a separation between a highway and adjacent land users to maintain the quality of life that existed prior to the construction of a highway project and are not

assumed to provide any measurable noise reduction benefits. Benefits of perimeter walls may include, but are not limited to, minimizing visual impacts, providing a visual screen when existing vegetation is removed, providing separation to adjacent land owners, maintaining access control restrictions, and others. In recent years perimeter walls have been constructed as part of several projects due to the negative impact on residents living near the road improvement when noise walls were not justified in an effort to preserve the quality of life for those affected.

The decision to include perimeter walls within a project is not automatic and requires input from a local municipality or land owner(s). The initial assessment for the use of a perimeter wall should typically be performed during the Project Development and Environment (PD&E) process and only when such a wall is requested by a local municipality or a substantial group of affected residents/property owners. The results of the perimeter wall analysis shall be documented in a Perimeter Wall Justification Report. This is a standalone report and is not part of any environmental document. Final decisions made during the Design Phase will be added to the report by addendum. The final decision for the use of a perimeter wall should be made during the Design Phase when the final conditions and cost are available for consideration.

To assure that the use and costs of perimeter walls are consistent across the state, guidelines containing the process and design methodologies to be used when considering the use of perimeter walls can be found in Chapter 32 of the **Plans Preparation Manual**, Volume 1.

Landscaping: Living trees, shrubs, wildflowers and other plants can be important elements in the overall context of a project. In most urban and suburban locations, the roadway should be designed to accommodate existing and proposed landscape features. Except when invasive exotic plants are present, designers should conserve as much of the natural landscape as possible. Conservation and landscaping can be part of the project scope or can be added to the scope during the PD&E phase. Landscaping can also be programmed as a separate project in the future. If landscaping is planned or may be added in the future, the roadway should be designed to accommodate the landscape design. The design could include identifying possible locations for landscaping and adding selected soils, designing the cross section and slopes to accommodate the landscaping and selecting turf choice. The roadway design PM should work closely with the District Landscape Architect in this process. The landscaping should be designed to fit into the theme and to be complementary to the other design elements. Plants can be integrated into the overall design to provide shade for pedestrians and transit users at stops, reduce runoff, screen unsightly views and improve air and water quality. If there are

separate projects, the roadway design PM and the landscape design PM must coordinate effectively throughout their projects. Landscaping maintenance and irrigation is normally provided by local agencies. Necessary agreements must be in place before landscaping can be constructed. Useful landscaping references include Chapter 9 of the *PPM, Volume 1* and the [Florida Highway Landscape Guide](#).

Pedestrian and Bicycle Needs: The need for safe and convenient facilities for pedestrians and bicyclists is a common issue raised by communities considering transportation improvements. Urban and suburban roadways should be designed to accommodate pedestrians and bicyclists as well as vehicles. Refer to Chapter 8 of the *PPM, Volume 1*.

Elderly and Disabled Needs: Road and pedestrian users may have special needs. The FDOT's compliance with the Americans with Disabilities Act (ADA) provisions is detailed in *Procedure No. 625-020-015, Facilities Access for Persons with Disabilities*. Additional information can be found at the [FDOT ADA/Accessibility Program](#) website. Elderly users present special needs. The FDOT's policy concerning older road users can be found in *Policy No. 000-750-001, Safe Mobility for Life*. Additional information can be found at the [Safe Mobility for Life Program](#) website.

Transit Needs: Another issue that is commonly high on community needs is enhancement of transit use, including attractive, accessible and convenient transit stops, shelters and other facilities. The roadway environment should accommodate transit facilities. Design resources include [Transit Facilities Guidelines](#), [Accessing Transit](#), and [From Bus Shelters to Transit Oriented Development](#).

Right of Way: Context sensitive solutions must be planned and designed to fit within existing or planned right of way. If an exceptionally important context sensitive solution requires additional right of way, this need must be identified early in the process and the necessary funding agreed to by all responsible parties.

Design Flexibility

Highway design is a process of balancing mobility and safety needs of roadway, pedestrian, bicycle and transit users within time and cost constraints. This process requires the professional application of design standards, criteria and guidelines. Designers must understand the latitude that exists in these standards, criteria and guidelines and exercise judgment to successfully achieve the proper balance of project needs. Context sensitive design adds to the mix of considerations the needs and desires of the community, usually including concerns of scale, visual continuity and aesthetics. Standards do not have to be relaxed to achieve a context sensitive design. The AASHTO publication, **A**

Guide for Achieving Flexibility in Highway Design, is a very useful reference in explaining the flexibility allowed in the AASHTO design guidelines.

Design speed is a fundamental input to design. AASHTO has recently adopted a new definition of design speed:

Design speed is a selected speed used to determine the various geometric features of the roadway. The assumed design speed should be a logical one with respect to the topography, anticipated operating speed, the adjacent land use and the functional classification of the highway.

The PPM defines design speed as a principle of design control that regulates the selection of many of the standards and criteria used in the design of the project. The selected design speed should be sensitive to the context of the road and balancing mobility as well as safety and community needs.

Design professionals are understandably cautious about increased liability associated with compromises in design criteria. Tort liability should be considered, but it should not be an impediment to the implementation of a context sensitive solution. The FDOT encourages flexibility within the range of design criteria found in the PPM and other references. When deviation from these criteria is necessary to meet community needs and desires a design variance or exception may be authorized.

To avoid delays, it is important to determine the need for design variations early in the process. When it is appropriate to propose a design element outside the guidelines, a request for design variation or design exception will be prepared in accordance with Chapter 23 of the ***PPM, Volume 1***, taking into account safety, economics, adopted standards and recognized engineering practices. It's important to document the process followed in design, and the reason(s) that actions were taken. Risk assessment and mitigation of the geometric condition is addressed in the documentation. Potential liability is minimized when the PM follows this process.